SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Fit a second degree parabola to the following data taking y as dependent variable.

x:	1	2	3	4	5	6	7	8	9
y:	2	6	7	8	10	11	11	10	9

17. A random variable X has the following probability function:

Values of X, :	0	1	2	3	4	5	6	7
$p(x)$:	0	K	$2k$	$2k$	$3k$	k^2	$2k^2$	$7k^2+k$

(a) Find k

(b) Evaluate $P(X<6)$, $P(X\geq 6)$, and $P(0<X<5)$.

(c) If $P(X\leq a)>\frac{1}{2}$, find the minimum value of a

(d) Determine the distribution function of X.

18. Obtain the first four moments about origin of binomial distribution.

19. Write the procedure for testing the hypothesis for large samples.

20. Three machines A, B, C gave the production of pieces in four days as below. Is there a significant difference between machines?

A	17	16	14	13
B	15	12	19	18
C	20	8	11	17

NOVEMBER/DECEMBER 2023

CACS42 — STATISTICAL METHODS AND THEIR APPLICATIONS – II

Time : Three hours Maximum : 75 marks

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SECTION A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Write normal equation for straight line.
2. Write normal equation for second degree parabola.
3. Define Mathematical Expectation.
4. State Baye's theorem.
5. Give the distribution function of Bionomial distribution.
6. Mention the relationship of mean, median and mode in normal distribution.
7. What is meant by test of significance?
8. A random sample of 400 flower stems has an average length of 10 cm. can this be regarded as a sample from a large population with mean of 10.2 and a standard deviation of 2.25 cm?
9. State all the assumptions involved in analysis of variance of technique.
10. Write down ANOVA table for two-way classification.

SECTION B — (5 × 5 = 25 marks)

Answer ALL the questions.

11. (a) Fit a straight line to the data given below. Also estimate the value of y at $x = 2.5$

x:	0	1	2	3	4
y:	1	1.8	3.3	4.5	6.3

Or

(b) Fit a straight line trend by Least Square method for the following data.

Year :	2005	2006	2007	2008	2009	2010	2011
Sales :	77	88	94	85	91	98	90

12. (a) State and prove Baye's theorem.

Or

(b) A problem is statistics is given to three students whose chances of solving it are $\frac{1}{4}$, $\frac{3}{4}$, and $\frac{1}{4}$. What is the probability that the problem will be solved if all of them try independently?

13. (a) (i) Determine the binomial distribution for which the mean is 4 and variance 3 and find its mode.

(ii) X is normal variate with mean 30 and S.D. 5. Find the probabilities that

(1) $26 \le X \le 40$

(2) $X \ge 45$

(3) $|X - 30| > 5$.

Or

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(b) The number of accidents in a year attributed to taxi drivers in a city follows a poisson distribution with mean equal to 3. Out of 1,000 taxi drivers, find approximately the number of drivers with

(i) No accidents in a year

(ii) More than 3 accidents in a year.

14. (a) Discuss the procedure for testing the significance of difference of two proportions.

Or

(b) A ransom sample of 500 apples was taken from a large consignment and 60 were found to be bad. Obtain the 98% confidence limit for the percentage number bad apples in the consignment.

15. (a) What are the various classification of analysis of variance?

Or

(b) Explain the following:

(i) Randomization

(ii) Replication.